ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS
Supported by Allotments of the Regional Research Fund,
Hatch Act, as Amended August 11, 1955
January 1 to December 31, 1967

1. PROJECT: SOUTHERN REGIONAL PROJECT S-9, "NEW PLANTS"

The Introduction, Multiplication, Evaluation and Preservation of New Plants for Agricultural, Industrial and Urban-Rural Uses.

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Experiment Stations	Representatives
Alabama	*C. S. Hoveland
Arkansas	*J. E. Bowers
Florida	*G. B. Killinger, Chairman
Georgia	*George Tereshkovich, Secretary
Kentucky	*N. L. Taylor
Louisiana	*E. N. O'Rourke
Mississippi	*H. W. Bennett
North Carolina	*W. T. Fike
Oklahoma	*R. S. Matlock
Puerto Rico	*J. Velez-Fortuno
South Carolina	*J. H. Martin
Tennessee	*W. E. Roever
Texas	*Eli L. Whiteley
Virginia	*T. J. Smith
Administrative Advisor	R. L. Lovvorn

U. S. Department of Agriculture

New Crops Research Branch, ARS	*J. L. Creech
	Quentin Jones
Plant Introduction Investigations	H. L. Hyland
Plant Materials Investigations	
Agronomic Crops	A. J. Oakes
Horticultural Crops	H. F. Winters
Chemurgic Crop Investigations	G. A. White
Cooperative State Experiment Stations Service	C. I. Harris
Utilization Research and Development Divisions, ARS	*I. A. Wolff
Soil Conservation Service	*W. C. Young

Southern Regional Plant Introduction Station, Experiment, Georgia

Regional Coordinator	W. R. Langford
Plant Pathologist	Grover Sowell, Jr.
Assistant Agronomist	J. H. Massey
Assistant Horticulturist	W. L. Corley

* Voting Members of the S-9 Technical Committee

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS

Seed or vegetative stocks of 931 new accessions representing 99 genera were added to the regional collection during 1967. Stocks of native blueberry species were collected in Georgia, Florida, Arkansas, New Jersey, and North Carolina.

The regional station grew 3393 accessions for seed increase, preliminary evaluation, and taxonomic classification. A catalogue of new materials increased at the regional station was prepared and distributed to plant scientists at state stations. Research workers in the South were supplied with 11,499 packets of seeds or plants for further evaluation and use in plant breeding and new crop development programs.

Field studies were continued in Florida, Georgia, North Carolina, South Carolina, and Texas to determine the best varieties and cultural requirements of kenaf as a source of paper pulp. Numerous introductions of pulse crops were evaluated for adaptation and yield in Oklahoma. Among the species studied were Cicer arietium, Pisum sativum, Cajanus cajan, Arachis hypogaea, Phaseolus spp., Dolichos lablab, Vigna sinensis, and Lens culinaris. All states in the region participated in the evaluation of ornamental plant introductions. Warm season forage introductions representing many species of grasses and legumes were evaluated in Puerto Rico, Florida, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma and Tennessee. Although additional testing is needed to determine the merits of these new introductions, many accessions that entered the program previously were found to possess disease resistance, cold-tolerance, or other desirable characteristics. These promising introductions are listed in Appendix A of this report. Results from disease screening studies at the regional station are summarized in Appendix B. A few introductions, through their use as breeding stocks in the development of superior crop varieties, entered commercial use in southern agriculture.

'Atkinson', a new rootknot nematode and Fusarium wilt resistant tomato of the Rutgers type, was developed and released by Auburn University. This new variety incorporated rootknot resistance of the wild Peruvian tomato P.I. 128657.

P.I. 153655, a red-skinned sweet potato from Tinian Island with poor quality but very high wilt resistance was used in the development of 'Redcliff' sweet potato, released by Clemson University.

'Ranger' squash, released by Clemson University, resulted from a cross of 'Summer Crookneck' squash and P.I. 172870. 'Ranger' is the first known virus-resistant summer squash variety. It is resistant to squash mosaic virus and has good tolerance to cucumber mosaic virus.

Cucumis sativus P.I's. 196289, 197087, and 220860 were used as sources of disease resistance and gynoecious genes in developing the female parent of 'Southern Cross' and 'Pioneer'. two new pickle-type cucumber hybrids now being increased for release by Clemson University. 'Gy-3', the female parent of these two hybrids, is resistant to downy and powdery mildew, anthracnose, and angular leafspot; and it has good tolerance to cucumber mosaic virus.

The seed of pigeon pea (Cajanus cajan) P.I. 218066 was increased for release in North Carolina as a green manure crop. This introduction is more productive than Crotalaria and it is non-toxic to livestock.

A survey was made to determine the plant material needs of research workers in the Southern Region. Results of the survey were used by the New Crops Research Branch of ARS in conducting plant explorations in Russia and Rhodesia.

The S-9 Technical Committee met at Texas A&M University July 18-19. Progress reports on new crops research given by each member are recorded in the Minutes, copies of which are available from the Coordinator. The next meeting of the S-9 Committee will be at Mississippi State University July 16-17, 1968.

4. USEFULNESS OF FINDINGS:

Improved crop varieties such as 'Ranger' squash, 'Redcliff' sweetpotato, 'Gy-3' cucumber, and others developed from superior breeding stocks provided through the S-9 Project should improve the efficiency of crop production in the South. New sources of disease resistance and other valuable germplasm found in the evaluation program in 1967 will enable plant breeders to continue their development of better varieties. New information obtained from cultural studies of kenaf and other species with chemurgic

potential will contribute toward development of new crops and further diversification of southern agriculture.

5. WORK PLANNED FOR NEXT YEAR:

The regional station will continue to receive, propagate, and catalogue new plant materials. Screening studies will be continued to locate new sources of disease resistance and other useful genetic characters. Further studies will be made at state stations to determine the cultural requirements of plants known to have chemurgic value.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

Georgia

Corley, W. L. Some preliminary evaluations of Cucumis plant introductions. Ga. Agr. Exp. Stas. Bul. N.S. 179. Dec. 1966.

Massey, J. H. Preliminary evaluations of some introductions of Persian clover, (Trifolium resupinatum L.) Ga. Agr. Exp. Stas. Bul. N.S. 180. Dec. 1966.

Massey, J. H. Preliminary evaluations of sesame plant introductions. Ga. Agr. Exp. Stas. Bul. 181. Dec. 1966.

Massey, J. H. Evaluation of plants with chemurgic potential. Ga. Agr. Exp. Stas. Res. Bul. 7. May 1967.

Puerto Rico

Singh Dhaliwal, T., Jordan Molero, J., and Torres Sepulveda, A. El Posible Cultivo de la Parcha Amarilla en la Region Oeste Central Montanosa de Puerto Rico, Univ. de Puerto Rico, Recinto de Mayaguez, Estacion Experimental Agricola, Pub. Miscel. 59. Feb. 1967.

Singh Dhaliwal, T., Perez Perez, R., Jorcan Molero, J., and Torres Sepulveda, A. Selecciones Prometedoras de Achiote para la Siembra de Pruebas Comerciales en Puerto Rico, Univ. de Puerto Rico, Recinto de Mayaguez, Estacion Experimental Agricola, Pub. Miscel. 61. April 1967.

Journal Series Papers

Barnes, D. K., R. H. Freyre, J. J. Higgins, and J. A. Martin. Rotenoid Content and Growth Characteristics of Tephrosia vogelii as Affected by Latitude and Within-Row Spacing. Crop Science. Vol. 7. March-April 1967. pp 93-95.

Oakes, A. J. and W. R. Langford. Cold Tolerance in Digitaria. Agronomy Journal, Vol. 59, No. 4. pp. 387-388. July-August 1967.

Sowell, G. Jr. The geographical distribution of cultivated plants resistant to diseases. Bul. Ga. Acad. Sci. 25:66. 1967 (Abstract).

7. APPROVED:

12-27-67
Date

Gordon B. Killinger
Chairman, Technical Committee

12-28-67
Date

R L Lovvorn
Regional Administrative Advisor

APPENDIX A
1967 Annual Report Regional Project S-9, New Plants

Plant Introductions that Exhibited Desirable Characteristics in S-9 Regional Evaluation Tests, 1967

Name & P.I. No.	State reporting	Reported value
Agronomic plants		
Arachis glabrata		
118457	Fla.	Good ground cover and forage legume
262144	Fla.	
262828	Fla.	
262839	Fla.	
Arachis hypogaea		
151982	Fla.	Good ground cover and lawn mixture
240561	Okla.	High yield and good quality
268601	Okla.	
268761	Okla.	
Arachis monticola		
263393	SCS	Good reseeding annual, forage type
Brachiaria brizantha		
292182	SCS	Highly productive
292183	SCS	
292187	SCS	
Brachiaria dictyonerua		
153053	SCS	Rapid recovery after grazing - productive over a long season
Brachiaria ruzizensis		
247404	P.R.	High forage yield
Cajanus cajan		
218066	N.C.	Productive green manure crop

Name & P.I. No.	State reporting	Reported value
Cenchrus ciliaris		
293325	SCS	(Rhizomatous - fine stems and leaves
Chloris gayana		
309962	SCS	(Stoloniferous - winter hardy
Chrysopogon montanus		
213885	SCS	(Vigorous bunch grass. Has promise for (erosion control and grazing
Digitaria eriantha		
106663	SCS	(Winter hardy
Dolichos biflorus		
179688	Ala.	(Productive, leafy summer annual forage (legume
Eragrostis bahiensis		
310004	SCS	(High forage yield - frost tolerant leaves
Eragrostis curvula		
208994	SCS	(Superior palability
299914	SCS	(High yield
Eragrostis lehmanniana		
295698	SCS	(Winter hardy - highly productive
Eragrostis superba		
295705	SCS	(Highly productive
Festuca arundinacea		
203728	SCS	(Good seed producer - spreads by stolons (and rhizomes

Name & P.I. No.	State reporting	Reported value
Hemarthia altissima		
299993	Fla.	(Frost and cold tolerance, early spring
299994	SCS & Fla.	(and late fall growth, spreads rapidly
299995	Fla.	(by stolons and rhizomes
Lespedeza virgata		
218004	SCS	(Low growing - has promise for use on (highway rights-of-way
Panicum antidotale		
284150	SCS	(Rapid recovery after mowing
Panicum miliaceum		
196292	SCS	(Produces large quantities of seed (relished by birds
Panicum maximum		
259553	P.R.	(
259568	P.R.	(High forage yield
Paspalum boscianum		
310046	SCS	(
310047	SCS	(Winter hardy - remains green most of
310051	SCS	(the winter in Florida
Paspalum hieronymii		
310107	SCS	(Very stoloniferous - rapid growing -
310108	SCS	(good ground cover
Paspalum notatum		
310143	Fla.	(
310144	Fla.	(
310149	Fla.	(Rapid growth
310150	Fla.	(
Stylosanthes sundiaca		
187098	Fla.	(Good summer forage legume

Name & P.I. No.		State reporting	Reported value
Horticultural plants			
Banana			
P.R.P.I. 2390		P.R.	(Tolerant to Sigatoka
Cucumis melo			
127524	182937	S.C.	(
134200	183055	S.C.	(
136169	210541	S.C.	(
136198	210542	S.C.	(
136225	211933	S.C.	(
149168	212895	S.C.	(Resistant to banded cucumber beetle
163219	223772	S.C.	((Diabrotica balteata)
164330	249560	S.C.	(
164331	271329	S.C.	(
164343	271335	S.C.	(
164720	295341	S.C.	(
164750	302446	S.C.	(
175109		S.C.	(
Lycopersicon esculentum			
273444		Ala.	(Dwarfness of plant, concentrated fruit set
Lycopersicon hirsutum			
127826		Ky.	(
127827		Ky.	(Mite resistance
251304		Ky.	(
Malus sylvestris			
209939		Ala.	(Vigorous and productive
Pisum elatus			
269761		Fla.	(Source of cold tolerance
Pisum sativum			
244175		Fla.	(Source of cold tolerance
244235		Fla.	(
257592		Okla.	(Good yield potential
257593		Okla.	(
Vigna sinensis			
269666		Fla.	(Early determinate fruiting pods on erect peduncles from small prostrate plants

Name & P.I. No.	State reporting	Reported value
Ornamental plants		
Cinnamomum daphnoides		
246661	Tenn.	(Excellent foliage plant for indoor use - (slow growing
Cotoneaster dammeri Scheid 'Skogsholmen'		
269293	Ga.	(Good ground cover plant - very low growing - (compact - vigorous
Cotoneaster microphylla		
285323	Ga.	(Evergreen - very compact - vigorous -
285343	Ga.	(low growing - spreading-type growth habit - (small and very attractive - ground cover
Cotoneaster rotundifolia		
285344	Ga.	(Foundation plantings - vigorous - upright (and open in growth habit
Cyanotis cristata		
238684	Tenn.	(Thrives under low light intensity
Eurya ochnocea		
235502	Ga.	(Specimen and foundation plantings - (compact - moderately virorous -evergreen - (glossy - very attractive
Hedera helix		
244685	Fla.	(Good ground cover plant
Ilex altaclarensis		
243844	Ala.	(Broadleaf evergreen with good foliage (and growth qualities
Itea japonica		
226131	Ga.	(Border, foundation plantings - vigorous - (compact - attractive - foliage turns red (in the fall

Name & P.I. No.	State reporting	Reported value
Ligustrum obtusifolium		
235136	Ga.	(Foundation plantings - vigorous - compact - (upright-spreading type growth habit
Malus hupehensis		
122586	SCS	(Good ornamental crabapple - produces red (buds and white flowers - has potential (as wildlife feed
Osmarea burkwoodii		
242241	S.C.	(Good ornamental for semi-shade - slow (growing
Osmanthus heterophyllus		
242291	Ala.	(Broadleaf evergreen with good foliage and (growth qualities
Osmanthus x fortunei		
238030	Ala.	(Broadleaf evergreen with good foliage and
242236	Ala.	(growth qualities
Pistachia chinensis		
21970	SCS	(Small ornamental with outatanding fall (foliage characteristics. Fruit is eaten (by small birds
Pyracantha coccinea Roemer 'Keessen'		
266770	Ga.	(Specimen, border plantings - vigorous - (upright and spreading growth habit - large - (attractive
Pyracantha crenulata 'Chinese Brocade'		
271307	Ga.	(Specimen, border plantings - vigorous - (upright and spreading growth habit - large - (attractive

Name & P.I. No.	State reporting	Reported value
Raphiolipis umbellata		
277664	Ala.	(Broadleaf evergreen with good foliage and (growth qualities
Rosa rugosa		
227432	Tenn.	(Dense, glossy, dark green foliage - free (from diseases
Ulmus pumila		
294104	Tenn.	(Vigorous, graceful, willow-like tree for (ornamental use

APPENDIX B
1967 Annual Report Regional Project S-9, New Plants

REGIONAL STATION PLANT PATHOLOGY REPORT FOR 1967

Grover Sowell, Jr.

1. Screening Plant Introductions for Disease Resistance

   (a) In cooperation with Dr. H. B. Harris all introductions which were resistant (disease index of 1 or less) in the 1966 field test were retested in 1967. The performance of the introductions was consistent between the two replications in this test. There were 268 introductions which received a disease index of 1 or less on the leaves. Stalk and head resistance was also excellent for the majority but not all of the introductions with leaf resistance. Alout 1/3 of the introductions failed to develop heads before frost. Six resistant introductions were selected from previous tests and planted in four replications. These were again highly resistant to the leaf and stalk phases of the disease. Head resistance was not consistent between replications of all except P.I. 164447.

   (b) Watermelon Mosaic Virus-2 (WMV-2) in Squash

   In cooperation with Dr. James Demski the 260 introductions of Cucurbita pepo maintained by the North Central Plant Introduction Station, Ames, Iowa, were screened for resistance. No resistance was found in these or in 8 cultivars.

   (c) Anthracnose of Lima Bean

   The collection of Phaseolus lunatus (131 introductions) maintained by the Western Regional Plant Introduction Station, was screened for resistance to Colletotrichum dematium f. truncata (Schw.) v. Arx. An introduction from India was highly resistant in the preliminary screening test.

   (d) Peanut Mottle Virus

   In cooperation with Dr. C. W. Kuhn, 435 introductions and cultivars were screened for immunity. No immunity was found, but the number of virus-free plants and the relative abundance of local lesions on the tester-host (Phaseolus vulgaris L. 'Topcrop') indicates differences in susceptibility. Further research may result in the detection of usable levels of resistance.

2. Supporting Research to Screening Plant Introductions for Disease Resistance

   (a) Sorghum anthracnose

   An isolate of the pathogen obtained from 'Dwarf Ladore' was more pathogenic on 'Martin' than standard isolates. This isolate was sporulating profusely on 'Dwarf Ladore', which has been highly resistant in the past. An isolate from 'Williams' was highly pathogenic on 'Williams' but caused only mild symptoms on 'Martin'.

(b) Lima Bean Anthracnose

Light increased the production of conidia on sterilized greenbeans. The optimum temperature for spore production on greenbeans or V-8 agar was 27-30°C. The number of conidia produced in green bean cultures increased with age until the 4th day. Flocculation of conidia suspended in water was severe making the accurate adjustment of concentration impossible. Addition of 3 M NaAc to make a 0.2M solution eliminated this problem with no apparent effect on infection. The severity of infection increased with increases in the concentration of conidia through a concentration of 10×10^3 conidia/ml.

(c) Cercospora Leafspots on Peanut

Cercospora arachidicola was easily isolated by transferring single conidia to V-8 agar. Adequate spore production to prepare an infective spore suspension was accomplished by flooding solidified V-8 agar in a petri dish with a suspension prepared from a young test tube culture. Cercospora personata did not produce enough conidia in culture to permit pathogenicity tests.

(d) Powdery Mildew of Cucurbits

A local isolate of Erysiphe chicoracearum DC was identified as race 2.

3. Compilation of Information on the Disease and Insect Resistance of Plant Introductions

The following disease data supplied by cooperators will be listed in the next seed catalogue:

1. Reactions of peanut introductions to sting, northern rootknot and peanut rootknot nematodes. Dr. L. I. Miller, Holland, Va.

2. Reactions of 900 Cucumis melo introductions to powdery mildew. Dr. T. W. Whitaker, La Jolla, California.

3. Reactions of 184 introductions of guar to potato virus S. Dr. C. E. Logsdon, Palmer, Alaska.

4. Reactions of 156 Cucumis melo introductions to watermelon mosaic virus 2. Dr. R. E. Webb, Beltsville, Md.

5. Reactions of several hundred Cucumis melo and Citrullus vulgaris introductions to Verticillium albo-atrum. Dr. C. B. Skotland, Prosser, Washington.

PROPOSED RESEARCH 1968

1. Anthracnose of Sorghum

   Pathogenic races will be investigated. Research on factors affecting infection will be resumed.

2. Anthracnose of Lima Bean

   Resistance in the introduction from India will be tested in a replicated greenhouse test and a field test.

3. Powdery Mildew of Cucurbits

   All Cucurbita maxima and C. pepo introductions will be screened for resistance to race 2. All introductions of Cucumis melo previously reported as resistant will be grown in the field and screened for resistance to race 2.